



# International Journal of Sciences: Basic and Applied Research (IJSBAR)

ISSN 2307-4531  
(Print & Online)

<http://gssrr.org/index.php?journal=JournalOfBasicAndApplied>



---

## Determination of Dental Caries Incidence on Elementary School Students in Kendari City

Rahminingrum Pujirahayu\*

*Bina Husada Kendari of Polytechnic, Kendari City 93231, Indonesia*

*Email: rahminingrum@gmail.com*

### Abstract

Teeth and mouth problems in Indonesia still require considerable attention to this day. This study aims to determine the determinants of dental caries in students in Kendari City. This study was an observational study with a cross-sectional analytic design. The location of this study was in primary schools in the working area of the Kendari City Health Office which was selected as the sample. The number of samples needed in this study was determined based on the proportion formula in two populations. The minimum numbers of samples needed were 100 students using a multistage random sampling technique with Proportional to Size probabilities. The statistical test used in this study is chi square with a value of  $\alpha = 0.05$ . The results showed that univariately it appears in table 1 that 51% of respondents had good tooth brushing habits, there were 66% of respondents still having the wrong manners to brush their teeth, there were 75% of respondents often eating cariogenic food, there were still 65% who did not do regular dental check up every 6 months. There is a relationship between variable brushing habits with the incidence of dental caries, has a p value = 0.001. There is a variable relationship between how to brush teeth with the incidence of dental caries, has a p value = 0.011. There is a relationship between variable cariogenic food consumption and the incidence of dental caries, which has a p value = 0,000. There is a relationship between variable periodic dental check with the incidence of dental caries, has a p value = 0,000. It was concluded that the habit of brushing teeth, how to brush teeth, the consumption of cariogenic foods, regular dental checkups were related to the incidence of dental caries.

**Keywords:** Caries; Dental.

---

\* Corresponding author.

## **1. Introduction**

The number of dental and oral problems in Indonesia is still quite high, especially dental caries [1]. Dental and oral problems in Indonesia still require considerable attention [2]. Data collected from the Basic Health Research [3] comprehensively shows that the national prevalence of dental and oral problems is 57.6% which means that the prevalence rate has increased compared to the results of the 2013 survey (25.9%). As many as 14 provinces in Indonesia have oral and dental health problems above the national standard where Central Sulawesi is the highest province in prevalence of dental and oral health problems of 73.5%. Dental caries in children at this time is influenced by behavioral factors. Lack of concern for dental and oral health can result in decreased productivity due to pain [4]. Remnants of food stuck to the teeth can cause tooth decay such as porous, hollow, etc. The impact caused by dental caries that occurs in children will hinder the development process in children, including a decrease in intelligence if it occurs continuously and in the long term will affect the quality of life of children [5]. One of the causes of dental caries in a person is a habit of consuming sweet and sticky foods, including feeling lazy and wrong way to brush teeth and rarely check dental health every 6 months can also cause dental caries [6]. Efforts to maintain dental and oral health should be done as early as possible as a form of prevention of dental caries in children. School is one of the most appropriate environments as a place for the promotion of dental health [7].

One of the efforts to maintain dental and oral health is to train a child's motor skills, including brushing teeth. The ability to brush teeth properly and correctly is an important factor in dental and oral maintenance [8]. The purpose of this study was to analyze the determinants of dental caries incidents including the habit of brushing teeth, eating habits of cariogenic food, how to brush teeth properly, and the behavior of having a routine dental check on the incidence of dental caries in elementary school students in Kendari City.

## **2. Materials and Methods**

This study was an observational study with a cross-sectional analytic design to see the relationship between tooth brushing habits, eating habits of cariogenic food, habit of regularly changing toothbrushes, routine dental check behavior towards dental caries events in elementary school students.

The location of this study was in elementary schools in the working area of the Kendari City Health Office that was selected as the sample. The time of research is September-November 2019. The number of samples needed in this study is determined based on the formula of proportions in two populations and the minimum number of samples needed is 100 students. The primary schools sampled were selected by multistage random sampling technique with Proportional to Size Probability.

The minimum number of schools sampled is 4 schools ( $\geq 10\%$ ) of the total existing schools. Then, grade IV and V students will be selected as samples with the consideration that students in grades IV and V will be easier to communicate with. Students who are sampled in this study will be randomized based on student attendance lists. The statistical test used in this study is chi square with a value of  $\alpha = 0.05$ .

### 3. Result

**Table 1:** Respondent Characteristics

No	Variable	category	f	%
1	School	SDN 51 Kendari City	29	29
		SDN 52 Kendari City	21	21
		SDN 53 Kendari City	31	31
		SDN 54 Kendari City	19	19
2	Class	IV	54	54
		V	46	46
3	Gender	Male	44	44
		Female	56	56
4	Age	9	36	36
		10	30	30
		11	34	34
5	Dental Caries	(+)	53	53
		(-)	47	47
6	Brushing-teeth habits	Poor	49	49
		Good	51	51
7	Brushing-teeth manner	Wrong	66	66
		Right	34	34
8	Eating Cariogenic food habits	Often	75	75
		Rare	25	25
9	Dental check up	Not done	65	65
		done	35	35

Based on table 1 about the characteristics of respondents it can be explained that the number of respondents was 100 students. Most respondents were in SD Negeri 53 Kota Kendari, coming from class IV, age 9 years and female sex. Univariately, 51% of respondents have good tooth brushing habits, meaning that they have brushed their teeth at least twice a day, ie in the morning after breakfast and at night before going to bed. 66% of respondents still had the wrong way to brush their teeth, which is brushing their teeth in the wrong direction and with too much pressure. There are 75% of respondents often eat cariogenic food. As many as 65% respondents do not regularly checking up their teeth every 6 months.

**Table 2:** Relationship between Tooth Brushing Habits and Dental Caries Incidence in SDN Kendari City

Tooth brushing Habits	caries (+)		caries (-)		p value
	f	%	f	%	
Poor	35	70	15	30	0,001
Good	18	36	32	64	
Total	53	53	47	47	

In table 2, out of 30 respondents who have poor tooth brushing habits, 35 people suffer more dental caries (70%), and in 64 respondents who have good tooth brushing habits, more respondents who do not suffer from dental caries as many as 32 people ( 64%). Based on the results of statistical tests found that there is a relationship between variables of tooth brushing habits with the incidence of dental caries, has a p value = 0.001.

Table 3 shows that of the 67 respondents who had the wrong way to brush their teeth, there were 42 people with dental caries (62.7%), and 33 respondents who had the right way to brush their teeth, those who did not suffer

from dental caries were 22 people (66, 7%). Based on the results of the statistical test it was found that there was a relationship between the way to brush teeth and the incidence of dental caries, having a p value = 0.011.

**Table 3:** Relationship between tooth brushing manners with dental caries in SDN Kendari City

Tooth brushing manners	caries (+)		caries (-)		p value
	f	%	f	%	
Wrong	42	62,7	25	37,3	0,011
Right	11	33,3	22	66,7	
Total	53	53	47	47	

**Table 4:** Relationship between consumption of cariogenic food and the incidence of dental caries in SDN Kendari City

Consume cariogenic food	caries (+)		caries (-)		p value
	f	%	f	%	
Often	50	66,7	25	33,3	0,000
Rare	3	12	22	88	
Total	53	53	47	47	

From table 4 it can be seen that of the 75 respondents who had frequent cariogenic food consumption, 50 people with dental caries (66.7%), and of the 25 respondents who had a rare cariogenic food consumption, more respondents who did not suffer from dental caries as many as 22 people (88%). Based on the results of statistical tests found that there is a relationship between variable consumption of cariogenic foods with the incidence of dental caries, has a p value = 0,000.

**Table 5:** Relationship of Periodic Dental Check up with Dental Caries in SDN Kendari City

Periodic Dental Check Up	caries (+)		caries (-)		p value
	f	%	f	%	
Not Done	46	70,8	19	29,2	0,000
Done	7	20	28	80	
Total	53	53	47	47	

In table 5, 65 respondents did periodic dental examinations, more people suffered from dental caries as many as 46 people (70.8%), and in 35 respondents who did periodic dental examinations, more respondents did not report dental caries as many as 28 people (80%). Based on the results of statistical tests found there is a relationship between variables checking teeth regularly with the incidence of dental caries, has a p value = 0,000.

#### 4. Discussion

One health problem that needs to be addressed is dental and oral health problems. Dental health problems in Indonesia are still interesting to study because caries prevalence and periodontal disease reach 80% of the population frequency [3]. Dental health efforts need to consider aspects of the environment, education, public

awareness and dental health management, including prevention and care [9]. The main group affected by dental caries is the age group of 6-14 years with a DMF-t index of 2.21 [10]. This might be due to lack of understanding the need to maintain oral health, where the eating patterns of elementary school students who prefer sweets (sweets, chocolates, etc.) and the lack of awareness of parents to bring their children to check their teeth [11]. Dental caries that are not treated will cause pulp tissue abnormalities and periapical and revoked. This may be due to lack of knowledge about the importance of caring for damaged primary teeth. So many people are letting their teeth become more damaged and extracted themselves. Awareness to apply positive habits is very important in maintaining daily dental and oral hygiene in children. To increase this awareness, health education is needed which includes adequate communication, motivation and parental instructions [9]. The high prevalence of dental caries is not much different from the results of the Riskesdas (basic health research) survey in 2013 in which the survey results showed the prevalence of dental caries in Indonesia reached 46.5% [12]. There are different levels of dental caries experienced by male and female. Dental caries was more experienced by male students (60.9%) than female students. The percentage of dental caries that occurs in men is greater than in female due to a variety of habits that affect it. Female are better at maintaining oral hygiene than male. This is because female prioritize and have awareness of the maintenance of clean teeth so that it will be more diligent to brush teeth. Male usually pay less attention to oral hygiene and are lazy to brush their teeth compared to female students, there is also a tendency for female students to avoid sweets because they worry about being fat [13]. Out of 100 respondents, 49% of students have the habit of brushing their teeth less and 51% have a habit of brushing their teeth well. If it is explained based on the criteria for quantity of brushing your teeth, time of brushing teeth and the tools used in brushing teeth, there are 66% of students who brush their teeth not at the right time ie in the morning after breakfast and at night before going to sleep. As for the quantity criteria for brushing teeth and the tools used to brush teeth, most students already have good habits related to this matter. This shows the need for information and education for students to be able to change these habits to prevent dental caries. Bivariate analysis results between the habit of brushing teeth and dental caries in this study showed a value of  $p < 0.05$ , 0.001. This means that the tendency to brush teeth is poor related to the incidence of dental caries. Tooth brushing after breakfast and before going to sleep will affect the severity of dental caries with a chi square test value of  $p = 0.011$ . If someone has the habit of brushing their teeth after breakfast then the respondent will have a tendency to have fewer and less severe dental caries. This also happens to the habit of brushing teeth at night before going to bed. Respondents who have the habit of brushing their teeth before going to bed tend to have a mild level of dental caries [14]. There is a strong correlation with negative direction between tooth brushing behavior and dental caries level with  $p = 0,000$ . That is, the better the behavior of tooth brushing, the level of dental caries will be mild. The results of research conducted in Yogyakarta showed a significant relationship between the habits of brushing teeth before going to bed at night with dental caries in respondents. Caries is a hard tooth tissue disease caused by microorganism activity in a fermented carbohydrate and can occur because there is a combination of four causative factors namely, host, microorganism, substrate and time. Caries can be prevented by modifying the causative factor by removing plaque. Brushing teeth is the main mechanical way to remove dental plaque. The recommended habit of brushing teeth is at least twice a day, in the morning after eating and at night before going to sleep [15]. The habit of brushing teeth before going to bed can clean the rest of food stuck to the teeth so that plaque formation during sleep can be inhibited and plaque accumulation is reduced. At night there is a decrease in salivary secretion, the rate of salivary flow

during sleep is around 0.03 ml / min with the total volume of saliva during sleep within 8 hours of only about 15 ml. The most important time for someone to brush their teeth is before going to bed at night, because salivary flow decreases during sleep and the protective effect of saliva is lost. Saliva plays an important role in the process of caries prevention, reduced salivary secretion can reduce the ability to clean the oral cavity, and increase plaque formation [16]. Univariately, the results showed that most students (66%) were wrong in practicing tooth brushing. These results reflect that students' knowledge about brushing their teeth is still lacking. The results of bivariate analysis showed that students who brushed their teeth incorrectly were associated with dental caries compared to students who brushed their teeth correctly. In this study, there were several respondents who routinely brush their teeth but still suffer from dental caries. This may be influenced by several factors including the level of concern of children towards the right way to brush their teeth. Brushing teeth back and forth and strong pressure can cause damage to teeth including dental caries. The results of research conducted in Yogyakarta showed that in general elementary school students lacked knowledge of the correct way to brush their teeth. It was found that only 57.3% of elementary school students could answer the procedure for brushing their teeth correctly. Brushing your teeth in the wrong direction with too much pressure can cause tooth wear and gum loss (gum recession) [17]. For this reason, providing information to elementary school students about how to brush their teeth properly needs to be improved. Children who are used to regularly brushing their teeth will certainly be proven through oral hygiene. However, regular brushing does not necessarily produce good oral hygiene. This can be due to the time and manner in brushing that are not right. Teeth brushing technique for children must be a brushing technique that is easy to understand and simple, so that it will definitely be done by children or their parents. Basically, the technique of brushing teeth for children is that all tooth surfaces are brushed until they are completely clean [18] This explanation can be directly and continuously explained to children and their parents in order to obtain satisfactory conditions of oral hygiene. The results of this study indicate that almost all respondents (77%) often eat various types of cariogenic food. This means that within a week almost all students eat cariogenic food more than 4 times. For that, it needs more integrated prevention and supervision efforts so that this will discontinue becoming a bad habit. The results of this study indicate that students who frequently eat cariogenic foods are associated with the incidence of dental caries compared to students who rarely consume cariogenic foods. The results of this study indicate that students who frequently eat cariogenic foods are associated with the incidence of dental caries compared to students who rarely consume cariogenic foods. Frequent consumption of sweet foods will tend to have dental caries. In a study conducted in the city of Makassar, 92% of primary school students found that eating cariogenic food > 2 times a day. Statistical results show a significant relationship between cariogenic food with the occurrence of dental caries with a value of  $p = 0,000$ . Similar results were also found by [19], who found that there was a significant relationship between eating habits of cariogenic food and the experience of dental caries with. The statistical results show the value of  $p = 0,000$  [6]. In this study it can be seen that from 100 students who examined dental and oral hygiene, the number of students who have a good level of dental and oral hygiene is not much different from students who have a level of poor dental and oral hygiene. The average value of OHI-S shows 1.8 results in the WHO category, including the moderate category. Meanwhile, there were no students with poor levels of dental and oral hygiene. The results of the bivariate analysis showed that there was a relationship between not doing routine dental check every 6 months and the incidence of dental caries with a  $p$  value = 0,000. Mother's knowledge and attitude towards children's health / dental and oral care is quite good but

her behavior is not in accordance with her knowledge and attitude. RISKESDAS 2018 shows the prevalence of people with dental-mouth problems and who received treatment from dental medical personnel in the last 12 months is 23.4%, and there is 1.6% of the population who have lost all their original teeth. This situation shows the still low awareness and ability of the community to seek treatment at the right service facilities [20].

## **5. Conclusion**

Based on the results of the study and discussion above, this study can be concluded that the incidence of dental caries in elementary school-age children is related to the variable of brushing habits with dental caries, tooth brushing manners, the consumption of cariogenic foods and regular dental checkups every 6 months. Authors recommends the students for dental examinations at least once every 6 months regularly, also brush their teeth properly after consuming food.

## **References**

- [1] P. Setianingtyas, L. Prihastari, and N. Wardhani, "Efektivitas Berkumur Teh Hitam Terhadap Penurunan Akumulasi Plak Pada Anak Usia 7-8 Tahun," *ODONTO Dent. J.*, vol. 5, no. 1, pp. 60–66, 2018.
- [2] H. Lusiani Yetti, MH Etty M, "Manfaat mengunyah permen karet yang mengandung xylitol dan non xylitol dalam menurunkan indeks plak pada siswa – siswi kelas VI-A pada SDN 060930 Titi Kuning Kecamatan Medan Johor tahun 2014," *J. Ilm. PANNMED*, vol. 9, no. 2, pp. 134–137, 2014.
- [3] Kementerian Kesehatan Republik Indonesia, *Riset Kesehatan Dasar*. Jakarta: Badan Litbangkes, 2018.
- [4] M. Reddy and S. Singh, "Viability in delivering oral health promotion activities within the Health Promoting Schools Initiative in KwaZulu-Natal," *SAJCH South African J. Child Heal.*, vol. 9, no. 3, pp. 93–97, 2015.
- [5] L. S. Setiari and M. Sulistyowati, "Tindakan Pencegahan Karies Gigi Pada Siswa Sekolah Dasar Berdasarkan Teori Health Belief Model," *J. PROMKES*, vol. 5, no. 1, p. 65, 2018.
- [6] A. Rosidi, S. Haryani, and E. Adimayanti, "Hubungan antara Konsumsi Makanan Karsinogenik dengan Kejadian Karies Gigi," *Prosising Semnas*, pp. 299–305, 2014.
- [7] Asio, "Pengaruh Pelatihan Menggunakan Modul Cara Menyikat Gigi terhadap Pengetahuan Guru SD Unggul Sakti Kota Jambi," *J. Kesehat. Gigi*, vol. 03, no. 1, pp. 1–4, 2016.
- [8] R. Gopdianto, A. J. M. Rattu, and N. W. Mariati, "Status Kebersihan Mulut Dan Perilaku Menyikat Gigi Anak Sd Negeri 1 Malalayang," *e-GIGI*, vol. 3, no. 1, 2014.
- [9] M. A. Lely Suratni, F. Sintawati, and L. Andayasari, "Pengetahuan, Sikap, dan Perilaku Orang Tua tentang Kesehatan Gigi dan Mulut pada Anak Usia Taman Kanak-kanak di Provinsi Daerah Istimewa

Yogyakarta dan Provinsi Banten Tahun 2014,” *Media Penelit. dan Pengemb. Kesehat.*, vol. 26, no. 2, pp. 119–126, 2016.

- [10] M. N. Pay, S. Widiati, and N. W. Sriyono, “Identifikasi faktor yang mempengaruhi perilaku anak dalam pemeliharaan kebersihan gigi dan mulut: Studi pada Pusat Pengembangan Anak Agape Sikumana Kota Kupang, Nusa Tenggara Timur, Indonesia,” *Maj. Kedokt. Gigi Indones.*, vol. 2, no. 1, p. 27, 2017.
- [11] Arwani and SamiasihErnawati, “Hubungan Antara Perilaku Mengonsumsi Makanan Manis Dan Perilaku Menggosok Gigi Dengan Kejadian Karies Gigi Pada Anak Tk Pertiwi 37 Gunung Pati,” *Fikkes J. keperawatan*, vol. 4, no. 183–193, pp. 1–12, 2011.
- [12] Kementerian Kesehatan Republik Indonesia, *Riset Kesehatan Dasar*. Jakarta: Balitbangkes RI, 2013.
- [13] Rara G, “Hubungan Tingkat Pengetahuan Dengan Perilaku Pemeliharaan Kesehatan Gigi Anak Sdn Kauman 2 Malang,” *J. Heal. Educ.*, vol. 2, no. 2, pp. 201–210, 2017.
- [14] H. Alifiani, “Hubungan Kebiasaan Gosok Gigi dan Konsumsi Makanan Kariogenik,” *Faletehan Heal. J.*, vol. 4, no. 4, pp. 228–232, 2017.
- [15] L. Pitriyanti and N. W. Septarini, “Determinan Karies Gigi Pada Anak Sekolah Dasar Di Pulau Nusa Penida, Klungkung, Bali Luh,” *J. Virgin*, vol. 2, no. I, pp. 1–14, 2016.
- [16] D. Triswari and A. Dian Pertiwi, “Pengaruh Kebiasaan Menyikat Gigi Sebelum Tidur Malam Terhadap Skor Indeks Plak dan pH Saliva,” *Insisiva Dent. J. Maj. Kedokt. Gigi Insisiva*, vol. 6, no. 2, pp. 1–8, 2017.
- [17] H. Hestiani, N. Yuniar, and P. E. Erawan, “Efektivitas Metode Demonstrasi(Sikat Gigi) Terhadap Peningkatan Pengetahuan, Sikap Dan Tindakan Terkait Pencegahan Karies Gigi Pada Siswa Kelas Iv Dan V Di Kecamatan Ranteangin Kabupaten Kolaka Utara Tahun 2016,” *J. Ilm. Mhs. Kesehat. Masy.*, vol. 2, no. 5, pp. 1–10, 2017.
- [18] Arianto, “Peran Orang Tua , Teman , Guru , Petugas Kesehatan Terhadap Perilaku Menggosok Gigi Pada Siswa Sekolah Dasar di Kecamatan Sumberejo The Role Of Parents , Friends , Teacher ’ s , Health Worker Influencing Teeth Brushing Behavior On The Elementary School St,” *J. Anal. Kesehat.*, vol. 2, no. 2, pp. 270–275, 2017.
- [19] J. N. Sihite, “Hubungan Perilaku Pemeliharaan Kesehatan Gigi dan Mulut dengan Pengalaman Karies dan Oral Indeks Higiene pada murid SMP,” 2011.
- [20] Kemenkes RI, *Pedoman Usaha Kesehatan Gigi Sekolah (UKGS)*. 2012.